

REMARKS

Claims 1-2, 4-9 and 11-27 are now pending in this application, claims 3 and 10 having been canceled and new claim 22-27 having been added. The currently pending claims are presented for consideration in view of the foregoing amendments and the following remarks.

Applicants appreciate having had the opportunity to conduct an interview with Examiner S. McArthur, which interview took place on July 30, 2003 and was conducted on behalf of Applicants by Gavin R. Cunningham, Reg. No. 46,122. During the interview, U.S. Patent 6,155,540 to Takematsu, et al. was discussed, claim 1 was discussed (including a discussion of the "vibrating the vaporization region" limitation and whether any method of vaporizing a processing liquid disclosed in Takematsu necessarily includes vibrating a vaporization region), and claim 6 was discussed (including a discussion of the "dislodging residue" limitation). No agreement was reached as to whether or what sort of an amendment might result in allowance of the pending claims. However the discussion was helpful, and the Examiner agreed to carefully consider whatever additional arguments Applicants may submit in support of the pending claims as part of a response to the present Office Action.

The Office Action rejected claims 1-3, 5, 6, and 9-13 under 35 U.S.C. §102(e) as being anticipated by Takematsu et al., U.S. Patent 6,155,540 (hereinafter "Takematsu"). Applicants respectfully traverse the rejection specified above based at least on the fact that Takematsu does not appear to teach vaporizing a processing liquid within the vaporization region of the injection valve "via a pressure drop within the vaporization region"

in the context of a method that also includes the step of vibrating the vaporization region as required by pending amended independent claims 1 and 9. As such this reference cannot anticipate the present invention.

Support for the limitation of vaporizing the processing liquid within the vaporization region of the injection valve, which limitation was recited in original claims 3 and 10, now canceled, may be found on page 7, lines 3-7, which reads, in relevant part: "[d]ue to the pressure decrease experienced as the processing liquid travels from the orifice 19 to the vaporization region 21, the processing liquid vaporizes and mixes with the carrier gas as the processing liquid enters the vaporization region 21." Support for vaporizing the processing liquid "via a pressure drop within the vaporization region" may be found in the above quoted passage, as well as on page 6, lines 5-10 of the as-filed specification, which reads, in relevant part: "a pressure drop within the vaporization region 21... causes processing liquid supplied to the processing liquid inlet 13 to vaporize as it passes from the processing liquid inlet 13... to the vaporization region 21."

Takematsu appears not to teach vaporization via a pressure drop in the context of a method for vaporizing liquid material that also involves vibration. In particular, while Takematsu contains passages and/or figures that may teach vaporizing liquid material within a vaporizer by directing a flow of the liquid material so that it impacts and is atomized by an ultrasonic vibrator (e.g., either within or adjacent to the vaporizer), after which the atomized liquid is vaporized by a combination of heat and a circular flow of a carrier gas, none of those passages and/or figures appear to contain any mention or

consideration at all even of the topic of pressure, much less any specific teachings or suggestions relating to vaporizing the liquid material via a pressure drop.

As explained above, Takematsu fails to teach vaporizing the processing liquid within the vaporization region of the injection valve "via a pressure drop within the vaporization region" in the context of a method of vaporizing a processing liquid that also includes vibration of the vaporization region, as required by pending amended independent claims 1 and 9. As such, Applicants urge that the present rejection of those claims be withdrawn and that claims 1 and 9 be allowed. Further, pending claims 2, 4-8, and 11-13, being claims that depend from claims 1 or 9, are respectfully submitted as patentable over Takematsu for at least the same reasons. As stated above, claims 3 and 10 have been canceled without prejudice, so the present anticipation rejection of claims 3 and 10 is no longer at issue.

The Office Action also:

a.) rejected claims 4 and 16-21 under 35 U.S.C. §103(a) as being unpatentable over Takematsu in view of U.S. Patent No. 4,684,104 to Micard (hereinafter "Micard");

b.) rejected claims 7 and 14 under 35 U.S.C. §103(a) as being unpatentable over Takematsu in view of U.S. Patent No. 5,925,189 to Nguyen et al. (hereinafter "Nguyen"; and

c.) rejected claims 8 and 15 under 35 U.S.C. §103(a) as being unpatentable over Takematsu in view of Nguyen, in further view of U.S. Patent No. 5,413,671 to Ketchum.

Applicants respectfully traverse all such obviousness rejections.

The Manual of Patent Examining Procedure places important restrictions on the manner in which an Examiner may combine references for purposes of an obviousness rejection. For example, "[i]t is improper to combine references where the references teach away from their combination." MPEP §2145.X.D.1. Furthermore, a "[p]roposed modification cannot render the prior art unsatisfactory for its intended purpose or change the principle of operation of a reference." MPEP §2143.01.

Applicants respectfully submit, at least based on the reasoning provided below, that the Examiner has violated both of the above rules in proposing the above combinations of (1) Takematsu and Micard, (2) Takematsu and Nguyen, and (3) Takematsu, Nguyen and Ketchum. As such, applicants urge that the Examiner reconsider the proposed combinations, and accordingly withdraw each of the above obviousness rejections.

Takematsu specifically criticizes liquid vaporization systems which provide for spraying a liquid into a vaporization region "under a pressure to form the vapor of the material" (Takematsu column 1, lines 60-62), reciting as a drawback of such systems that "the amount supplied to a CVD apparatus cannot be set to a desired value because the condition of the material obtained by the atomization is different to a great extent depending on the pressure and the flow rate in the spraying under a pressure." (Takematsu column 2, lines 13-18). Takematsu thereafter teaches vaporizing apparatus having a vaporizer tank 9 (col. 5, line 65). During use of the vaporizing

apparatus of Takematsu, a flow of liquid is directed into, and atomized upon impact with, an ultrasonic vibrator 14 of an ultrasonic atomizing device 15, causing the liquid to atomize either within (see FIG. 2) or directly adjacent (see FIG. 3) the vaporizer tank 9. After atomization, the resultant liquid particles are caused to blend into a swirling flow of relatively warm carrier gas within the vaporizer tank 9, which has a circular cross-section to encourage such swirling flow, during which the particles are converted from the liquid state into a vapor.

The vaporizing apparatus of Takematsu is apparently intentionally free (see, e.g., FIGS. 1-3) of any locally-located mechanisms or devices to stop, start, or otherwise control or meter a flow of liquid into to the vaporizer tank 9. Instead, Takematsu provides remotely-located equipment (see the liquid flow rate controller 3 and the check valve 5 of FIG. 1, and the exemplary pumps of FIGS. 4 and 5) specifically designed for such purposes and connected to the vaporizer tank 9 via a liquid inlet 5. Takematsu therefore must also be regarded as teaching away from combining the functions of controlling and metering a flow of liquid and vaporizing the liquid flow within the same device.

Applicants note that the relevant fuel injection methods and apparatus of Micard and Nguyen fall squarely into the above-mentioned category of pressurized-spray vaporizers specifically criticized by Takematsu. For example, in relevant part, Micard teaches the use of a "low pressure injection valve" (Micard col. 3, lines 25-26) "connected to a fuel source...at a predetermined pressure." (Micard col. 3, lines 26-27) to provide "air-fuel primary mixture" (Micard col. 3, line 24-25) under a "pressure

difference." The injection valve of Micard includes a closure member 30, percussively driven by a piezoelectric actuator, which is used to meter a delivery rate (Micard col. 1, line 31) of the incoming flow of fuel. For its part, Nguyen teaches providing "an active gas component in a liquid form" (Nguyen col. 1, line 22) through a "gas orifice" (Nguyen col. 3, line 9) of an "injection valve 24" (Nguyen col. 1, line 63) which "causes the liquid to vaporize into gaseous form" (Nguyen col. 1, lines 25-26) via a "pressure drop" (Nguyen col. 1, line 25). The injection valve of Nguyen "controls the amount of flow" (col. 3, line 8) of the liquid form gas component by a "plug 66 which is moved in and out" relative to an inlet line 26.

The fuel injectors of both Micard and Nguyen therefore vaporize via a pressure drop in the manner specifically criticized by Takematsu, and include local flow control and metering functions which Takematsu assigns to remote equipment, presumably (given the criticism levied by Takematsu against such fuel injectors) to achieve better performance in the control and metering of liquid flow. Takematsu thus must be considered to teach away from both Micard and Nguyen. As such, the primary reference of each of the present obviousness rejections teaches away from the methods and apparatus of a secondary reference, a circumstance which the MPEP clearly provides is impermissible. See MPEP §2145.X.D.1. In a related point, the foregoing also demonstrates that Takematsu, in teaching away from both pressure-drop vaporization and local flow control and metering, also teaches away from the present invention, a significant factor to be considered in determining obviousness (e.g., especially since the

Examiner has cited Takematsu as a primary reference). See MPEP §2145.X.D.2.

Given the above analysis, it may now be considered even more clear that Takematsu simply does not teach an injection valve (an issue first raised in Applicants' response of February 6, 2003 to the Examiner's 11/6/2003 Office Action). Moreover, it is also now apparent that introducing what is clearly "foreign" injection valve technology as taught by either Micard or Nguyen (see also the portion of Applicants' response of February 6, 2003, which addresses the issue of destroying the function of Takematsu) to the vaporizing apparatus portion of the overall system of Takematsu would defeat the basic function-splitting arrangement taught by the primary reference and would therefore be in violation of the above recited MPEP sections. See MPEP §2143.01.

As explained above, all of the combinations of references proposed in support of the present obviousness rejections are improper, since each requires either a combination of Takematsu with Micard, or a combination of Takematsu with Nguyen. As such, Applicants urge that the present obviousness rejections of claims 4, 7, 8, and 14-21 be withdrawn, and that the same claims be allowed.

Applicants further urge that the subject matter of originally-filed claim 1, now identically repeated in new claim 22, should be reconsidered and found allowable over the prior art of record. Accordingly, Applicants respectfully request the same, further urging that when performing the requested reconsideration, the Examiner carefully consider the detailed reasoning provided herein, especially that which explains further that Takematsu does not disclose an injection valve.

Applicants also direct the Examiner's attention to the remaining new claims 23-27, which depend from amended claim 1, amended claim 9, original claim 16, original claim 17, and new claim 22 (which was formerly original claim 1), respectively. *Inter alia*, each of the new claims 23-27 are directed to subject matter related to flowing pressurized processing fluid through a restrictive orifice and into a vaporization region. Applicants urge that new claims 23-27 are allowable for at least the same reasons that the independent claims from which they depend are allowable.

Finally, and as is relevant to all pending claims, according to §2112 of the MPEP, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. (First emphasis in original, second emphasis added). See also, In re Rijckaert, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993) (reversed rejection because inherency was based on what would result due to optimization of conditions, not what was necessarily present in the prior art). The MPEP further provides that:

[t]o establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

MPEP §2112; quoting In re Robertson, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted); and

[iln relying upon the theory of inherency, the examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art.

MPEP §2112; quoting Ex parte Levy, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original).

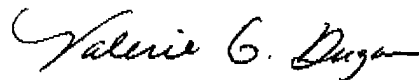
As regards the issue of inherency, applicants direct the Examiner's attention to page 3, lines 14-17 of the present specification, which provides that the term "vibrating" as used in the present specification and claims, rather than referring to vibration for purposes of atomization and/or vaporization, instead refers to "vibration sufficient to dislodge particles from an injection valve's vaporization region." Referring again to Takematsu (see, e.g., FIG. 1), whatever the inherent properties of the atomizing device 15 of Takematsu may or may not be, the Examiner would appear to violate both the letter and the spirit of the above-recited procedural authority by assuming those inherent properties to include the capacity to vibrate a vaporization region sufficient to dislodge particles from the vaporization region.

At least based on the lack of any apparently relevant disclosure within the four corners of Takematsu to support such a function, and especially given the apparently incomplete state of the record on the inherency issue, Applicants urge that to conclude against Applicants

on the issue of whether such a function may necessarily be taught by Takematsu would be inconsistent with the MPEP. As such, Applicants respectfully request that the Examiner reconsider and withdraw all rejections that depend on a resolution of the present inherency issue, at least until such time as the Examiner may, in accordance with the Examiner's burden under MPEP §2112, come forward with relevant facts and/or specific technical reasoning sufficient to support the same.

Applicants believe the pending claims are now in condition for allowance, and respectfully request reconsideration and allowance of the same. Please charge deposit account no. 04-1696 in the amount of \$84.00 for new independent claim 22. No other fees are believed necessary. However, if any other fees are required, please charge Deposit Account No. 04-696 accordingly. Applicants encourage the Examiner to telephone the undersigned attorney should any issues remain.

Respectfully Submitted,



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